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sea Islanders, by Sir Julius Vogel, London Colonial Institute.—*Otis T. Mason, Washington, D. C.*

The publishers of the NATURALIST furnish the editor of this department with a few separate impressions of the Anthropological Notes, and he will cheerfully supply copies to contributors of short sketches if they will send their address.

GEOLOGY AND PALÆONTOLOGY.

GLACIAL PHENOMENA IN BRITISH COLUMBIA.—In a recent pamphlet, entitled "On the Superficial Geology of British Columbia," Mr. G. M. Dawson draws fresh attention to the moraines, glacial grooves and ice marks in north-western America. His conclusions which we append are of a good deal of interest in connection with the former statements made as to the lack of glacial deposits in Alaska and neighboring regions southward.

1. The character of the rock striation and fluting on the south-eastern peninsula of Vancouver island shows that at one time a great glacier swept over it from north to south. The glacier must have filled the Strait of Georgia, with a breadth, in some places, of over fifty miles, and a thickness of ice near Victoria of considerably over six hundred feet. Traces of the glaciers are also found on San Juan island, and the coast of the mainland.

2. The deposits immediately overlying the glaciated rocks, besides hard material locally developed, and probably representing *moraine profonde*, consist of sandy clays and sands, which have been arranged in water, and in some places contain marine shells. These, or at least their lower beds, were probably formed at the foot of the glacier when retreating, the sea standing considerably higher than at present.

3. Observations in the northern part of the Strait of Georgia, and the fjords opening into it—where the sources of the great glacier must have been, show ice-action to a height of over 3000 feet on the mountain sides. The fjords north of the Strait of Georgia show similar traces. Terraces along the coast of the mainland are very seldom seen, and have never been observed at great elevations.

4. In the interior plateau of British Columbia there is a system of glaciation from north to south, of which traces have been observed at several localities above 3000 feet. Subsequent glaciation, radiant from the mountain-ranges, is also found.

5. The superficial deposits of the interior may be classified as unmodified and modified. The former, representing the Boulder-clay, hold many water-rounded stones, with some glacier-marked, and occurs at all heights up to over 5000 feet. The latter characterize nearly all localities below 3000 feet, and are most extensively developed in the northern low country, where they appear as a fine white silt or loess.

6. The interior is marked with shore-lines and terraces from the

present sea-level up to 5270 feet, at which height a well-marked beach of rolled stones occurs on It-ga-chuz mountain.

7. Moraines occur in great numbers. Some of the moraine-like accumulations may have been formed in connection with the north-to-south glaciation. Most of those now seen, however, mark stages in the retreat of glaciers towards the various mountain ranges. The material of the moraines resembles that of the Boulder-clay, but with water-rounded stones even more abundant.

8. The sequence of events in the interior region has been : glaciation from north to south, with deposit of Boulder-clay, formations of terraces by lowering of water-surface, accompanied or followed by a warm period ; short advance of glaciers from the mountains contemporaneously with the formation of lower terraces ; retreat of glaciers to their present limits. Glaciation of Vancouver island may have occurred during both the first and second cold periods, or during the second only.

9. If the north to south glaciation has been produced by glacier ice, it must have been either (*a*) by the action of a great northern ice-cap (against which grave difficulties appear), or (*b*) by the accumulation of ice on the country itself, especially on the mountains to the north. In either case it is probable that the glacier filled the central plateau and, besides passing southward, passed seaward through the gaps and fjords of the coast range. The Boulder-clay must have been formed along the front of the glacier during its withdrawal, in water, either that of the sea, or of a great lake produced by the blocking by local glaciers of the whole of the valleys leading from the plateau, to a depth of over 5000 feet.

10. If general submergence to over 5000 feet be admitted, the Japan current would flow strongly through Behring's Strait, and over part of Alaska, while Arctic ice-laden water, passing south across the region of the Great Plains, would also enter the central plateau of British Columbia, accounting for the north to south glaciation and simultaneous formation of the Boulder-clay.

THE SPECIES OF RHINOCEROS OF THE LOUP FORK EPOCH.—Prof. Cope recently exhibited to the American Philosophical Society the crania of three species of rhinoceros which he had obtained from the Loup Fork beds of Kansas and Colorado. Two of them which were new to science, he named *Aphelops fossiger* and *A. malacorhinus*. Of the third species, the *A. megalodus* (Cope), two crania were exhibited, one of them in a remarkable state of preservation. Three crania of the *A. fossiger* and one of the *A. malacorhinus* furnished their distinctive characters. The *A. megalodus* is the smallest species, and about as large as the smaller race of the *Rhinocerus sondaicus* according to Cuvier. It has a narrow elevated occiput, long and smooth nasal bones, a contracted preorbital region, and one large infraorbital foramen. The *A. malacorhinus* is a very peculiar species. It has very short

and small nasal bones, a broad front and a narrow and high occiput. The preorbital region is concave, and there are three infraorbital foramina. It is as large as the existing *Atelodus bicornis*. In the *A. fossiger* the occipital region does not rise above the level of the front, and is laterally expanded. The preorbital region is wide and convex, and there is one large infraorbital foramen. The size is about that of the *A. malacorhinus*, but the molar teeth are larger than those of the *Rhinoceros indicus*. They are peculiar in the great vertical depth of their fossæ, and the isolation of the posterior notch as a pit. This species was quite abundant during the period of the Loup Fork epoch, and were contemporaries of the *Mastodon campester* and several species of horses.

HIGH AND LOW WATER IN THE ST. LAWRENCE RIVER.—Unlike most rivers the St. Lawrence is not subject to sudden or very noticeable fluctuations in respect to the depth of its waters. It is stated, however, by residents in the vicinity that once in about seven years the water rises two or three feet above its ordinary level. There is no question but that this is the case in certain years, although it may be doubted whether the period of unusual rise commonly given is according to the fact. Two years ago, in the summer of 1876, the extraordinary height of the water in Lake Ontario and in the river above the rapids was a subject of common remark. The rise and subsidence are both gradual, continuing several months in the year mentioned, lasting throughout the entire summer and autumn. I am not informed in regard to the existence of any special records of observations made to determine the cause of this somewhat striking phenomenon. If it is due to an unusual fall of snow the preceding winter, causing an increase of water throughout the immense territory drained by this river, the fact can be determined directly from the Weather Reports furnished by the Signal Service Bureau.—*M. A. Veeder, Antwerp, N. Y.*

THE PALÆONTOLOGY OF VICTORIA.—As palæontologist to the Geological Survey of Victoria, Prof. McCoy has lately issued the fifth decade of the survey publications. This is a series of ten plates, with text, illustrating some of the more interesting fossils which have lately come under the notice of the surveyors. One of the more noteworthy of the fossils here described and figured is a curious object resembling the calcareous axis of a large sea-pen living in Hobson's Bay, but considerably larger. It is believed that it can claim a place in the European Tertiary genus *Graphularia*, and is accordingly described as *G. robinæ*. In shape the fossil is conical below and quadrate above, while internally it exhibits on fracture a radiating crystalline structure. Its interest lies in its curious resemblance to a belemnite. Some time ago it was announced that a belemnite had been discovered

in Tertiary rocks in Australia, an announcement which of course created much surprise, since it had previously been an article of geological faith that belemnites were exclusively mesozoic fossils. Prof. McCoy now suggests that the fossil taken for a belemnite may have been the new *Graphularia* which he describes in the present decade, or some other very similar fossil. Another notable Victorian fossil noticed here for the first time is an eared seal of Pleistocene age, to which the name of *Arctocephalus williamsi* is given.—*Academy*.

GEOGRAPHY AND TRAVELS.

GEOGRAPHICAL NOTES.—The *Geographical Magazine* contains a map showing the Himalayan explorations of Mullah, one of the explorers of the Great Trigonometrical Survey of India.—Dr. Kirchhoff, President of the Halle Geographical Society, has discovered, in the library of the University, a copy (apparently) of part of the original log book of Captain Cook, during his voyage in 1772. The book was bequeathed to the library referred to by John Reinhold Foster, Cook's companion, who died in Halle.—Lieut. Wyse at last accounts was exploring the Isthmus of San Blas, the narrowest point between the Atlantic and Pacific oceans.—M. Deloncle of Lyons, concludes from documents in his hands, that (1) Lake Tanganyika was not known to be in existence at the time of the missionary journeys of the 14th, 15th and 16th centuries; (2) that Mayamuezi, Ugogo, Uganda and other districts were known in the fourteenth century; (3) that Lakes Victoria and Albert Nyanza, Banguelo and Moero had been explored at the same time; (4) that the wide northern affluent of the Lualaba, discovered by Mr. Stanley, issues from the Albert Nyanza; (5) that Lake Nyanza was a basin, much larger than now.—Dr. Traummüller of Leipzig, who resided at Batavia between 1867–1870, in the course of many excursions in the interior of Java, visited the volcanoes Gede and Panggerango, and the famous "Valley of Death." The carbonic acid gas which here accumulates to a height of two or three feet above the ground is noxious to small animals, but harmless to human beings. A former connection between Asia and Java appeared to the author to have once indubitably existed.—On the 6th of May, a little schooner, the *Willem Barrents*, an eight ton craft, sailed from Amsterdam for a six months' cruise in the Arctic regions. The whole ship's company consists of fourteen—six scientific experts and eight sailors and officers. The enterprise is strictly national, foreign aid having been refused, and nothing even having been asked of the Dutch Government, but everything being supplied by voluntary contributions. The schooner will pursue the track of previous Dutch navigators, along the north-west coast of Spitzbergen, to Nova Zembla, and thence as far to the north-west as can be reached in season for the schooner to return before next winter.—The *Times* says the